Saskatchewan
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Saskatchewan
Geological Survey

Saskatchewan Exploration and Development Highlights 1996

A.J. Gracie and R.W. Bennett

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A.J. Gracie [1] *and R.W. Bennett* [2]

Surface mineral exploration expenditures are estimated at $33 million in 1996, an increase of $4.5 million or 16 percent over the 1995 figure (Table 1). Although grassroots uranium exploration expenditures will increase by 20 percent this year, they will still be dwarfed by those for underground exploration and development. Expenditures related to the Cigar Lake and McArthur River properties alone are four times the exploration figure. In addition, construction of the McClean Lake mine/mill and new production developments at Cluff Lake are projected to add a further $144 million to uranium activity in 1996. Expenditures on gold and base metals exploration remain low. The Komis gold mine will reach full production by year end; however, the Goldfields Project and the Konuto Lake copper deposit developments are on hold. Diamond exploration expenditures will increase as drilling and sampling of the Fort-à-la-Corne and Candle Lake diamondiferous kimberlites continues.

Table 1 - Exploration expenditures.

	1995 (actual)	1996 (estimated)
Uranium	12.5 (29)	15 (60)
Gold	8 (0)	8 (28)
Base Metals	4	4
Diamonds	4	6
Total	28.5	33

Notes:
Figures are rounded to the nearest million dollars. Uranium and gold test or developing mine expenditures are in brackets. Expenditures at the McClean or Cluff Lake properties are not included.

URANIUM

Saskatchewan remains the focus of uranium activity in Canada. The average 1994 uranium spot price of $US9.31/lb U_3O_8 increased to $US11.46/lb U_3O_8 for 1995 and to $US15.76 for the first eight months of 1996. This upward price trend is expected to continue, into the foreseeable future which bodes well for the Saskatchewan uranium industry. Consequently, the 1996 estimate of uranium exploration expenditures projects a 20 percent increase over 1995.

Mine and mill developments continue at McClean Lake with the mill expected to be ready by July 1, 1997. The Joint Federal-Provincial Panel on Uranium Mining Development in Northern Saskatchewan is conducting environmental reviews of three projects. The Joint Panel completed its review of the McArthur River Project and is preparing recommendations for the governments of Canada and Saskatchewan. The other two projects, Midwest and Cigar Lake, are in the final stages of review by the Joint Panel. If the projects receive approval, construction at McArthur River, where underground exploration exceeded expectations, and at Cigar Lake could begin in 1997 with commercial production starting as scheduled in 1999. Construction at Midwest is not scheduled for several years.

Cameco is the key player in uranium mining and exploration in Saskatchewan, controlling over 50 percent of currently identified reserves. Cameco is now owned 89.7 percent by public shareholders and 10.3 percent by the Saskatchewan government. In 1996, The Crown Investments Corporation of Saskatchewan sold shares through a secondary offering including an over allotment option. Saskatchewan's mines produced 9822 t U (25.53 million lb U_3O_8) in 1995 up 9 percent from 1994, making the province the world's leading producer with 93 percent of Canadian output and approximately 30 percent of world output. Sales amounted to 9392 t U (24.42 million lb U_3O_8) valued at $432 million in 1995. Uranium production and sales in 1996 should exceed those in 1995. Because Rio Algom Mines Ltd. closed their Stanleigh mine at the end of June 1996, Saskatchewan is now the only uranium producing province in Canada.

Reserve and production figures for the three operating production facilities are presented in Table 2. Currently identified reserves within the Athabasca Basin are sufficient to sustain production well into the next century. On the exploration side, some ten companies make up current uranium exploration joint ventures. Exploration in all parts of the Athabasca Basin is aimed at the discovery of another major deposit of the Key Lake–Cigar Lake unconformity type, although as usual, it is concentrated in the east and southeast. Discovery potential still remains high as mineralized holes are common in this area where programs may test unconformity targets at depths exceeding 500 m.

Rabbit Lake

Cameco, operator (66.7%); Uranerz Exploration and Mining Ltd. (33.3%)

The Rabbit Lake mill continued to operate on a one-week-up/one-week-down schedule in 1996. Production, which was a record 2875 t U (7.5 million lb U_3O_8) in 1994 rose a further 10 percent to 3154 t U (8.2 million

(1) Resident Geologist, Saskatchewan Energy and Mines, P.O. Box 5000, La Ronge, SK S0J 1L0.
(2) Mineral Assessment/Mineral Deposits Index Geologist, Saskatchewan Energy and Mines, 1914 Hamilton St., Regina, SK S4P 4V4.

Table 2 - Published reserves from Saskatchewan uranium mines.

Owner(s)*	Property/Deposit	Reserves (t U) (Unstandardized)	Grade %U	Production (t U) 1995***	1996****
	RESERVES**				
Cameco–Uranerz Expl. Mining	Rabbit Lake			3154	3962
	Collins Bay B	770	0.27	-	-
	Collins A	6 500	4.82	-	-
	Collins D	2 200	1.86	-	-
	Eagle Point	13 300	1.11	-	-
Cameco–Uranerz Expl. Mining	Key Lake Deilmann	20 000	1.3	5462	5385
Cameco–Uranerz Expl. Mining–Cogema Res.	McArthur River P2N	72 700	15.9	-	-
Cigar Lake Mining (Cameco–Cogema Res.–Idemitsu–Kepco)	Cigar Lake	136 000	11.5	-	-
Cogema Res.–Corona Grande	Cluff Lake	16 500	0.8	1206***	2020
Cogema Res.–Tenwest–OURD	McClean, JEB and SUE Trend	19 300	2.78	-	
Cogema Res.–Tenwest–Uranerz Expl. Mining–OURD	'Midwest'	13 800	3.81	-	-
	RESOURCES**				
Cameco–Uranerz Expl. Mining	Eagle Point	8 500	0.9	-	-
Cameco–Cogema–PNC–Kepco	Dawn Lake	11 500	1.67	-	-
Cameco–Uranerz Expl. Mining–Cogema Res.	McArthur River P2N	87 600	10.19	-	-

Notes:
* Operator first
** "Reserves" and "Resources" are Cameco definitions. All figures in the table may not be exactly comparable.
*** 1995 production figures from Cameco annual report in those cases where Cameco controls the deposit. Cluff Lake figure obtained by subtracting the Cameco total from the provincial total published by Saskatchewan Energy and Mines.
**** 1996 production estimated.

lb U_3O_8) in 1995, and is planned to increase to 3962 t U (10.3 million lb U_3O_8), or another 26 percent in 1996. Virtually all the mill feed was provided by the Eagle Point underground mine.

Government production approvals for the Collins Bay A and D zone mines were received in 1995. These two, small, high-grade uranium deposits, which lie offshore in Collins Bay, have required diking before open pit mining. The dike for the Collins Bay D zone was constructed in 1995; mining began in late 1995, and was completed in the spring of 1996. Construction of the dike around the Collins Bay A zone was completed in the spring of 1996 with mining scheduled for the winter of 1996-97.

At Eagle Point, the company is mining the 144 and 02 zones. Present proven mining reserves will be exhausted in the year 2001. An underground drill program will test the 01, 02 strike extension, 03, N60, Island, and 144 lower extension zones. These underground zones offer good potential to add to existing ore reserves.

Cameco continues to actively explore the property surrounding the mine. For example, the company has undertaken programs to trace the SUE zones south onto the Rabbit Lake property and to upgrade the Dawn Lake reserves.

Cluff Lake

Cogema Resources Inc., operator (80%); Corona Grande Exploration Corp. (20%)

At Cluff Lake the company has a two year licence from the Atomic Energy Control Board (AECB) for increased annual production from 1500 t U (3.9 million lb U_3O_8) in 1995 to 2020 t U (5.3 million lb U_3O_8) in 1996 and 1997. The mill started continuous operation on October 3, 1995 and is now running at full capacity.

The Dominique-Peter mine and the Dominique-Janine underground and extension open pit mines are providing ore for this expansion. Significant reserves have been established at West Dominique–Janine.

In the Dominique-Peter (DP) mine, known reserves in the Center and South zones will be exhausted this year, except for DP Center structures below the 150 m level and the north portion of the A_1A_2 area where reserves will last until late 1996 or early 1997. An access haulage drift was completed down to the 100 m level in the DP Center area and an underground diamond drill program will be undertaken in October to test mineralization and structure patterns below the 100 m level. The company continues to mine a north-south vein system in the upper stoping area and a shallow dipping vein system in the lower stopes in the Dominique-Peter north zone. The mining method is still lean undercut and fill except in the case of the lower angle veins.

The Dominique-Janine open pit and underground mine are now in production. The pit reached a depth of 50 m below surface in early September 1996 and is scheduled to last until 1997. The excavation waste is being used to back fill the Dominique–Janine North and Claude open pit. The Dominique-Janine underground mine is being exploited using a decline, two levels and four active stoping areas employing conventional mining methods (undercut and fill). Rock types, structural patterns and grades are similar to those in the Dominique-Peter underground mine located about 1 km to the northeast. The company is in the process of driving a 900 m access ramp north-northwest from the Dominique-Janine underground mine to the West Dominique–Janine deposit. An underground diamond drill program will be completed on this deposit that has mineralization located from 140 to 300 m below surface. Mining by jet boring from surface is being tested on one of two high-grade pods at the Athabasca Group unconformity on the shore of Cluff Lake, south of the Dominique-Janine extension pit. These pods are classical uranium unconformity mineralization like the D orebody and are offset by the north-south Dominique-Janine structure.

The West Dominique–Janine area has been tested by significant drill programs every year from 1993 to 1996. The area directly south of West Dominique–Janine has a good potential for finding "unconformity-type" mineralization in inverted thrust blocks of Athabasca Group sandstone. Unlike in the West Claude area, mineralization at the Dominique-Peter and Dominique-Janine areas has not been found to extend to the north.

Key Lake

Cameco, operator (66.7%); Uranerz Exploration and Mining Ltd. (33.3%)

Key Lake achieved record production of 5462 t U (14.2 million lb U_3O_8) in 1995. Although mining of the Deilmann open pit will be completed in the second quarter of 1997, milling of the stockpiles will continue to the end of the decade. Currently, part of the Deilmann pit (DC expansion) has been converted into a Tailings Management Facility (TMF) based on the "pervious" surround model pioneered at the Rabbit Lake mine site. This new tailings facility replaces the above-ground facility which has been in use since start up.

Subject to government approval, the McArthur River project, located 80 km to the north of Key Lake, will extend mill life at Key Lake a minimum of 15 years, and is scheduled to start supplying ore to the Key Lake mill in 1999. It is planned to gradually increase the annual mill production to 6924 t U (18 million lb U_3O_8). The Deilmann TMF will accommodate the tailings from the McArthur ore.

A four month pilot plant operation was conducted at Key Lake to determine the feasibility of nickel and cobalt extraction from the tailings stored in the above-ground TMF. If the outcome is positive, Cameco will construct an 840 tpd plant, at a cost of $45 million, with a targeted production start-up in 1998. This operation would process approximately 3 million tonnes of tailings over its 11 year life. Annual production is targeted at 3175 t Ni and 227 t Co. This operation will assist decommissioning of the Key Lake TMF.

Cigar Lake

Cigar Lake Mining Corporation: Cameco Resources Ltd. (48.75%); Cogema Resources Inc. (36.375%); Idemitsu Uranium Exploration Canada (12.875%); and Korea Electric Power Corporation (2.0%)

The owners propose to develop the Cigar Lake deposit at a capital cost of $410 million, subject to regulatory approval. The project site has been operated on a care and maintenance basis since 1993. An Environmental Impact Statement (EIS) has been submitted and is being reviewed by the Joint Federal-Provincial Panel. Assuming project approval, managerial responsibilities will be reassigned so that Cameco will operate the mine, ore will be processed approximately 80 km away at the McClean Lake mill, operated by Cogema Resources Inc., and Idemitsu Uranium Exploration Canada Ltd. will provide administrative services and monitor the activities of the mine and mill operators.

To accommodate Cigar Lake ore, the McClean Lake mill will be expanded from an annual production capacity of 2300 t U (6 million lb U_3O_8) to 9200 t U (24 million lb U_3O_8). Under the terms of the agreement, the Cigar Lake joint venture will produce up to 6900 t U (18 million lb U_3O_8) per year and the McClean Lake joint venture will produce 2300 t U (6 million lb U_3O_8). The new milling arrangements offer several environmental advantages, including the shared use of a common tailings facility in the mined out JEB deposit pit and a simplified decommissioning and reclamation program. The economic advantages include economies of scale, reduced capital costs, and an accelerated schedule for Cigar Lake ore. The $410 million project price tag includes the expansion of the McClean Lake mill.

Underground development, and the construction and expansion of the surface facilities could commence in 1997 (after all permits are in place) and take two years. Mining will be undertaken in two phases: Phase 1, beginning in 1999 and lasting 11 years, will deal with the rich eastern part of the orebody, while Phase 2 will remove the remainder. After a start-up period of one to two years, with increasing production, the mine will output up to 6900 t U (18 million lb U_3O_8) annually during

Phase 1. During Phase 2, annual production from the lower grade ore will drop to 2300 t U (6 million lb U_3O_8), but will last a further 28 years. Reclamation and decommissioning will follow, if no additional reserves are discovered, and take up to five years.

Access to the underground workings is by the test mine No. 1 shaft. A second shaft will provide an alternative access, and will be the exhaust outlet for the primary ventilation system. Mine rock will be hoisted through the No. 1 shaft. The ore, in the form of a slurry, will be pumped to surface through specialized, cased boreholes. A third shaft is planned for Phase 2. Drifts will be developed, on two levels, in basement rock beneath the orebody. From these drifts the ore will be mined in panels using a jet boring, non-entry method within a frozen orebody. Freezing will improve ground conditions, prevent water inrush, and stop radon migration.

Midwest Property

Midwest Joint Ventures: Cogema Resources Inc. (56%); Tenwest Uranium Ltd. (19.5%); Uranerz Exploration and Mining Ltd. (20%); and OURD (Canada) Co. Ltd. (4.5%)

Although the Midwest mining project, as described in the 1991 EIS, failed to receive approval, Cogema Resources Inc., the majority owner and joint venture operator, still anticipates development of the McClean and Midwest properties in a complementary manner and expects a positive recommendation by the Joint Federal-Provincial Panel early next year on its revised EIS, submitted in 1995. Cogema looked for ways to overcome the safety and environmental concerns identified during the first review process. A new mining plan recommends using the jet-boring method, tested at Cigar Lake under very similar geological conditions. Ore will be milled off-site at McClean Lake. The new approach addresses the radioactivity and water inflow concerns at Midwest. Non-entry mining improves radiation protection because the high-grade ore is contained in pipes and tanks. Also, water inflow will be reduced dramatically by ground freezing. Since Mink Arm of McMahon Lake will not be drained, environmental impacts will be significantly reduced.

Assuming government approval, development at Midwest is planned to start in 2000 and production in approximately 2003 when the open pit mining phase at McClean Lake ends. The Midwest mine will produce 2200 t U (5.7 million lb U_3O_8) per year for six years, after which the underground operation at McClean Lake will be ready to take over.

McClean Lake

Cogema Resources Inc. (70%); Denison Mines Ltd. (22.5%); and OURD (Canada) Co. Ltd. (7.5%)

Cogema Resources Inc. announced the decision to develop the $250 million McClean Lake project in March 1995. Since then, construction has been on a fast track with production scheduled to begin July 1, 1997. Last winter, an on-site power supply system, permanent camp dormitories, a new kitchen, and recreation facilities were completed. The mill offices and warehouse are now occupied and the JEB water treatment plant and dewatering wells are operating. After encountering unsuitable ground, 300 steel piles were driven at least 20 m down to stable bedrock to support the ore receiving and grinding building. Starting in February, large cranes were used to erect the mill building's steel structure.

By July, construction of the project was 48 percent complete and on schedule. In September, the water treatment plant and mill dry area were complete. The ore receiving and grinding buildings were well advanced with the ball mill and SAG mill already set. The mill itself was also quite advanced with the solvent extraction, acid, and ammonium sulphate recrystallization plants in earlier stages of construction. The site also has a new road system.

Mining of the JEB pit reached 40 m below surface early in September 1996. The pit will be mined out by the end of 1996 and prepared for use as a tailings management facility. The tailings will be deposited underwater in paste form in the pit and when consolidated will prove less permeable than the Athabasca Group sandstone host rocks, which will act as a "pervious" surround envelope.

The SUE C open pit is being developed. Open pit mining will continue until the end of 2003 with the successive development of the SUE C, A, and B open pits. As noted, this open pit mining will be followed by the Midwest underground mine from 2003 to 2008 and the McClean underground mine from 2009 to 2011. Milling of both McClean and Midwest ores at the McClean Lake mill will provide for a total of 2300 t U (6 million lb U_3O_8) per year without considering Cigar Lake ore.

The SUE, A, B, C, and CQ deposits are clustered on the western edge of the Archean Collins Bay "dome", within a 2.9 km long northerly trending zone. The Sue A and B deposits occur in Aphebian age Wollaston Group basement rocks which flank the "dome" and in overlying Athabasca Group structures, at depths of 70 to 180 m below surface. The deposits are located within a zone of faulting and alteration. In the SUE A and B deposits, uranium oxides and silicates are associated with Ni-Co arsenides and Fe-Ni-Co-Cu sulphides. The SUE C and CQ deposits consist mainly of uranium oxides. The SUE A and B deposits were discovered by drilling conductive zones delineated by ground VLF and HLEM (Max Min) techniques. The SUE C and CQ deposits were identified by drilling DC resistivity and IP anomalies located 100 m away from the conductor axis.

McArthur River - P2 North

Cameco, operator (53.991%) (56.435%); Uranerz Exploration and Mining Ltd. (29.775%) (27.331%)*; and Cogema Resources Inc. (16.234%)*
( ) These figures are ownership at production*

The McArthur River deposit is the richest and among the largest high-grade uranium deposits in the world. The deposit has a total resource of 160 000 t U (416 million lbs U_3O_8) with an average grade of 12.7 percent

U (15% U_3O_8). This quantity includes proven reserves of 72 700 t U (189 million lbs U_3O_8) at an average grade of 15.9 percent U (18.7% U_3O_8). In addition, the potential for expanding the total reserves, beyond those already identified, is excellent because only 18 percent of the total length of the mineralized structure has been the subject of detailed underground drilling.

After completing the initial underground exploration program, Cameco submitted in late 1995, an EIS for the project to the Joint Federal-Provincial Review Panel. The McArthur River EIS will be considered jointly with that covering Cigar Lake. If approved, construction of the McArthur River project could begin as early as mid-1997 and would take approximately two years to complete. Production could begin in mid-1999, following the exhaustion of Key Lake reserves, and continue for 20 years.

Construction of the McArthur River site would involve the building of surface facilities, the excavation of a second and third shaft, and underground mine development. Construction would also include building a new 80 km road to Key Lake, where minor modifications to the mill would be required, along with the addition of a receiving plant for the McArthur River ore. Post-1995 capital spending to bring the project into production in 1999 is projected at $360 million. Pre-production underground activity requires drifts on the 530 m, 580 m, and 640 m levels as dictated by the position of the orebody. The three primary, non-entry mining methods to be used are boxhole boring, remote boxhole stoping (a variation of boxhole boring), and raisebore mining. Raisebore mining is the preferred method, although limited to areas where chambers can be developed above and below the ore zone. Variations in rock strength will require ground support utilizing rock bolts, steel mesh screen, and shotcrete. Grouting, and in some cases freezing of the ground, in the vicinity of the ore, will be required to control groundwater. To control radiation exposure, Cameco proposes to contain the ore in a crushing and grinding system and pump it to surface as a slurry, then ship it to Key Lake as a paste. The Key Lake mill will increase production from 5385 t U (14 million lbs U_3O_8) to 6924 t U per year (18 million lbs U_3O_8) and use the existing Deilmann tailings management facility.

GOLD

The gold sector, like uranium, is in a mining development phase. Claude Resources Inc., Saskatchewan's largest primary gold producer, continues to operate the Seabee mine successfully. The Cameco-operated joint venture Contact Lake mine did not meet expectations in 1995. Waddy Lake Resources Inc. is expected to be in full commercial production at the Komis mine by year end, and the Tyler Resources Inc. operated Weedy Lake joint venture is preparing the Golden Heart deposit at Waddy Lake for an underground bulk sampling program. While these mines illustrate that there are opportunities in the province, gold exploration is being undertaken by less than ten companies compared to over 60 in 1988. Greater Lenora Resources Corp. was inactive this year on the Box and Athona properties south of Uranium City. Claude Resources Inc., with an option to earn up to 70 percent in the Amisk Lake Joint venture owned by Cameco Corporation and Husky Oil Operations Ltd. in the Flin Flon area, completed a two phase drill program designed to increase drill-indicated reserves at the Laurel Lake decline. A third phase drill program has begun, a fourth will follow immediately, and a new reserve figure has been published.

La Ronge Domain

Contact Lake

Cameco, operator (66.7%); Uranerz Exploration and Mining Ltd. (33.3%)

The Contact Lake gold mine opened in January 1995. After experiencing some start-up difficulties, the mine and mill were operating very well by year end. Production is mainly from long hole with minor shrinkage stopes. In 1995, the 850 tpd operation milled 268 964 t of ore with an average mill-head grade of 6.20 g/t (0.18 oz/ton) Au and a recovery of 92.96 percent to produce 47,434 oz Au. Contact Lake reserves were assessed at 149,000 oz Au at 1995 year end. This reflects a downward revision by the joint venture of both reserves and resources, from almost 600,000 oz to 432,000 oz. Surface and underground drill programs have been undertaken to define new and redefine existing reserves. These programs are expected to be renewed in 1997. In 1996, exploration drifts were extended from the decline at levels 5244 and 5190. Drilling from the 5190 level and deep surface drilling sought to extend the gold mineralization down plunge to the southwest. The success of these programs is important. Without new reserves the Contact Lake mine will be depleted by 1998.

Byers Fault Area: Komis Deposit

Waddy Lake Resources Inc. (100%)

Waddy Lake Resources Inc. is a wholly owned subsidiary of Golden Rule Resources Ltd. Golden Rule has raised $9.2 million to bring the Komis mine into production and to carry out further exploration and development work on the Weedy Lake property, owned by Tyler Resources Inc. (operator, 50.1%), Golden Rule Resources Ltd. (37.6%), and Cameco Corporation (12.3%). Ore from the Komis mine is to be processed at the old Jolu mill acquired by Golden Rule for $786,000 from previous owner, International Mahogany Corp. and International Corona Corp. A new 16 km road linking the mine to Highway 102 has been constructed. The bulk sampling decline has been extended to the 300 m level, and a ventilation raise and haulage drift developed. Underground stope development began on the C and Y zones, followed by the A and D. Underground work exposed the new Q gold zone in the unexposed footwall of the deposit. The ore will be mined using conventional shrinkage stopes depending on zone width. Mineable reserves are 687 300 t of ore grading 10.3 g/t (0.3 oz/ton) Au (cut and diluted), plus possible reserves of 573 300 t grading 13.4 g/t (0.39 oz/ton) Au (uncut and undiluted). The deposit is open to the west along strike and down plunge. Ore haulage to the Jolu mill began at the end of July.

On August 31, 1996 mill start up commenced with the processing of low-grade ore at the rate of 343 tpd. The first gold pour of 1,256 oz Au took place on October 7, 1996 as a prelude to an anticipated monthly production of 3,200 oz increasing to 3,700 oz.

Although the Komis mine plan has gone through some changes due to refinement of the ore zones' geological interpretation, at the beginning of October, mining activities were focussed on the continuous development of six shrinkage stopes designed to feed the Jolu mill at a sustained rate of 400 tpd. The milling rate for Septem-

Table 3 - Published reserves from selected Saskatchewan gold properties.

Owner(s)*	Property	Reserves(t) or Production (oz or t)	Grade g/t	Grade oz/shrt ton
	MINED OR MINED TO DATE			
Cameco–Starrex–Uranerz Expl. Mining	Star Lake Mine 21+Rush zones**	76,947 oz 182 291	14.7	0.43
Cameco–Shore Gold	Jasper Mine**	82,697 oz 140 127	18.8	0.55
Claude Res. Inc.	Seabee	231,274 oz***		
Corona Corp.–Int. Mahogany Corp.	Jolu Mine Rod+Mallard**	203,751 oz**** 472 220	14.4	0.42
Greater Lenora Res. Corp.	Box	64,066 oz		
	RESERVES			
Cameco–Uranerz Expl. Mining	Contact Lake Mine Bakos zone	624 000	7.43	0.22
Claude–Cameco–Husky Oil	Laurel Lake	921 000*****	14.75	0.43
Greater Lenora Res. Corp.	Box and Athona Box Pit Athona Pit	16 600 000 12 200 000 4 400 000	1.7 1.7 1.8	0.05 0.05 0.05
Kristo Gold	Anglo-Rouyn mine tailings	1 451 500******	0.55	0.016
Waddy Lake Res.	Komis+EP	687 300	10.3	0.3
	RESOURCES			
Cameco–Golden Rule Res.	Corner Lake	181 500	13.03	0.38
Cameco–Uranerz Expl. Mining	Contact Lake Bakos zone	658 000	10.54	0.31
Cameco–Uranerz Expl. Mining	Pap	233 000	8.0	0.23
Claude Res. Inc.	Seabee	2 000 000	9	0.26
Claude–Cameco–Husky Oil	Laurel Lake	1 423 000	13.38	0.39
Golden Rule Res.	Niko	85 700	6.2	0.18
Golden Rule Res.–Comaplex Res.	Tower East	922 000	6.9	0.2
Radcliffe Res. Inc.	"North" Lake	2 360 000	2.4	0.07
Royal Oak–Golden Rule Res.–Cameco	Twin	351 100	6.2	0.18
Tyler Res.–Golden Rule Res.–Cameco	Weedy B Golden Heart	314 000 687 000	4.8 10.3	0.13 0.3
Waddy Lake Res.	Komis+EP	573 300	13.4	0.39

Notes:

* Operator first.

** Mined out.

*** To the end of the first 6 months in 1996.

**** This Reserve figure is included in the Resource figure.

***** Additional 1,500 oz estimated recovered during clean up. Possibly additional oz were also recovered in the test run.

****** Anglo-Rouyn mine tailings also contain 1.97 g/t (0.058 oz/ton) Ag, 0.19% Cu, and 4.5% magnetite.

ber averaged 343 tpd, a figure the company views favourably, given the down time that occurs during start-up operations. Initial mill feed will consist of development ore with run-of-mine stope ore gradually making up all the production within the next several months. Full commercial production is expected by year end. Mine production was planned at 140 000 t or 44,000 oz Au/yr; cash operating costs at $US248. The old Jolu mine will be used as part of the tailings management facility.

In the long term, Golden Rule plans are to construct a central mill with a large tonnage throughput capacity which will allow for the staged expansion of production from the Komis, Golden Heart, and Tower East gold deposits. Other satellite deposits associated with the Byers Fault are Niko, Comer, and Wedge lakes. Recently Golden Rule strengthened its position in this area by purchasing International Mahogany Corp.'s interest in various other 'Byers Fault' properties including Oven Lake, Tower Lake, Pus-Little, and Exit for a total price of $630,000. The Golden Heart deposit is the most advanced of these satellite deposits. Between December 1995 and June 1996, two drill programs costing $1.25 million and totaling 56 diamond drill holes or 12 158 m were completed to upgrade reserves, which prior to these programs, stood at 687 000 t ore grading 10.3 g/t (0.3 oz/ton) Au. A new reserve calculation is underway and a new 5000 m drill program is planned for the third quarter of this year. Underground exploration and development culminating in a bulk sample is scheduled in 1996 or 1997. The joint venture has budgeted $4 million for exploration.

Other La Ronge Domain Projects

Uranerz Exploration and Mining Ltd. and Cameco Corporation continued grassroots exploration programs which included drilling. Petro Plus Inc. drilled 17 more holes on the Devil Lake property for a total of 22 and plans bulk till sampling and drilling on other company properties, including the Anglo-Rouyn extension and Jepson Lake, and on parallel structures to the Devil Lake targets. Consolidated Pine Channel Gold Corp. and JNR Resources Ltd. plan to drill their Asbell Bay showing, a mylonite zone in the Berven Lake granodiorite which has yielded up to 14.1 g/t (0.411 oz/ton) Au over 1.68 m and has now been traced over 366 m. A second mineralized mylonite zone has been located 41 m north of it. Golden Band Resources Inc., now a big land holder in the Byers Fault area, continued a successful manual and back hoe bulk till sampling program, but has so far not announced results. The Kristo Gold Inc., Anglo-Rouyn mine tailings reprocessing project, was not active this year.

Glennie Domain

Seabee Mine

Claude Resources Inc. (100%)

To the end of 1995, the Seabee mine, Saskatchewan's largest gold producer, had processed in excess of 725 000 t ore with an average grade of 9.8 g/t (0.29 oz/ton) Au yielding 212,348 oz. The mill averaged 479 tpd throughput at a recovery rate of 94 percent. During 1995, 191 800 t averaging 7.42 g/t (0.22 oz/ton) Au were processed, yielding 43,010 oz, compared with 177 800 t averaging 9.43 g/t (0.28 oz/ton) Au, yielding 50,669 oz in 1994. Gold production was only 18,926 oz Au in the first six months of 1996, a reduction from the 21,904 oz achieved in the same period in 1995. However, second quarter production was 10,481 oz versus 8,445 oz for the first quarter, and the company expects this higher level of output to continue for the balance of the year. Extensive development and drilling at Seabee continues to yield positive results. The mine's mineral resource is now estimated at 2 million t grading 9 g/t (0.26 oz/ton) Au. The company reports that the new higher grade ore reserves combined with expansions of the Seabee mill capacity to 600 tpd in the latter part of 1995, will enable annual gold production to return to the 50,000 oz production target.

Mining in 1995 concentrated primarily on the 161 zone between the 120 and 250 levels. Additional tonnage was obtained from the 75 vein, 162 vein, and the 400 stope at the bottom of the 2 zone. Lower grade ore was milled from the now exhausted 5 zone, while these areas were being developed. Surface and underground drilling has discovered significant higher grade reserves in the 153 zone, located 170 m southwest of the 161 zone, and in 2C west. These zones were producing ore by the second quarter of 1996.

On March 29, 1996 the 153 zone was described as extending over a strike length of 125 m and to a depth of 400 m, with a true width of up to 7 m. At that time, the zone, accessible from current mine workings, was open along strike and to depth. This zone plus two parallel ones, added significantly to mine reserves. The 2C west area may also be extended at depth and to the southwest by further drilling.

On July 25, Claude Resources Inc. announced it had raised $10.56 million to be used, in part, to explore and develop deep reserves at the Seabee mine. If deep reserves, below the 425 m level on zone 2, are successfully established, a decline extension is planned to move this ore from the 300 m to 300 m levels. A shaft and hoist would move the ore from the 300 m level to surface close to the mill.

On surface, the company completed a 24 hole diamond drill program on the Currie Rose property, which identified three parallel zones over a strike length of 150 m and to a depth of 100 m. All zones are reported open along strike and at depth. This prospect is a southwest extension of the Seabee mine property 10 vein. Grades range from 5.15 g/t (0.15 oz/ton) Au to 38.76 g/t (1.13 oz/ton) Au over widths of 1.0 to 1.4 m. The company has also drifted out northeast from the 5 decline to the 18 zone, where, to the East Boundary zone, an extension of the 19 zone, will be drilled off. Another promising structure has been found just north of the 10 vein.

The 2B, 2C, and 5 zones are structurally controlled in near-vertical, northeast-trending, ductile shear zones which cut the medium- to coarse-grained, leucocratic to

melanocratic, Laonil Lake gabbro. Gold occurs in association with quartz veining and sulphide mineralization with the highest grades found where shears splay or branch. Ore zones within the shears range in thickness from 1.8 to 5 m. Visible gold is common, occurring with pyrite, minor chalcopyrite, and pyrrhotite. The 161 structure is approximately at right angles to the 5 zone, but quartz veins within the 161 zone follow the same 5 zone trend. The 75, 162, and 163 zones, all west-southwest structures, may be splays from the 5 zone. The 153 structure is north-northeast trending.

Claude Resources Inc. and Santoy Resources Ltd. have amended the Santoy Lake joint venture agreement. Their property is located some 8 km east of the Seabee mine. The amendments provide Claude the opportunity to increase working interest by spending $300,000 by January 1998. Prospecting and trenching identified eight gold zones in mineralized shear systems over a strike length of 7 km. Drilling on four of these zones encountered gold mineralization ranging from 2 g/t (0.06 oz/ton) Au to 25 g/t (0.73 oz/ton) Au with widths of 3 m. During the 1995 field season, a new gold-bearing, quartz-sulphide shear zone was discovered with values up to 13 g/t (0.38 oz/ton) Au. This shear is a high-priority exploration target. An exploration program this season consisted of compilation and detailed mapping near the gold showings prior to further drilling.

Other Glennie Domain Prospects

Four kilometres to the northeast of the Seabee mine, the Shore Gold Inc. (51%)–Shane Resources Ltd. (49%) and Shane Resources Ltd. (70%)–Claude Resources Inc. (30%) joint ventures prospected two separate properties at Munro Lake. The Shane Resources Inc. program of prospecting, overburden stripping, and trenching is expanding known targets and examining new showings with high-gold values in narrow quartz veins. Four grab samples from the new Glitter showing returned 8.61 g/t (0.251 oz/ton) Au, 0.45 g/t (0.013 oz/ton) Au, 23.32 g/t (0.680 oz/ton) Au, and 209.57 g/t (6.11 oz/ton) Au from metallic assays. The company tested two areas on the property with a 616 m drill program. The Shore Gold Inc. property also underwent detailed prospecting, stripping, trenching, and geochemical sampling on a zone discovered in 1994, which returned gold values of up to 14.06 g/t (0.41 oz/ton) Au and 1.62 percent Cu in grab samples. Although gold was the main exploration target, a nickel showing was also found when trenching exposed a pyroxenite. The next stage of exploration will include possible airborne geophysics, ground geophysics, and diamond drilling. JNR Resources Inc. plans to drill at Leland Lake after freeze up on six optioned claims. Although the new showings at Munro Lake are encouraging, the level of gold exploration in most of the Glennie Lake Domain is disappointing, given the continued operation of the Seabee mine.

Western Craton

Box and Athona Mine

Greater Lenora Resources Corporation (100%)

Greater Lenora Resources Corporation, has retained Behre Dolbear and Company Inc., of Denver, Colorado, to undertake a thorough due diligence of the ore reserve estimate contained in the previously completed feasibility report of the Goldfields Project. The report has been delayed due to the extensive amount of underground mining data which became available to the company this summer.

The previously calculated mineable reserves are 12.2 million t ore at an average grade of 1.7 g/t (0.05 oz/ton) Au in the Box pit, above a cut off grade of 0.475 g/t (0.014 oz/ton) Au, and 4.4 million t ore at an average grade of 1.8 g/t (0.05 oz/ton) Au in the Athona pit above a cut off grade of 0.515 g/t (0.015 oz/ton) Au. The combined total mill feed reserves are 16.6 million t ore at an average grade of 1.70 g/t (0.05 oz/ton) Au. The corporation will continue to explore the surrounding 28 330 ha property for additional mineralization. The property hosts several other gold exploration targets.

Other Western Craton Prospects

Consolidated Pine Channel Gold Corp. and JNR Resources Inc. have reported some very high gold values from the Norite Bay area. Two assay values from grab samples containing visible gold at the Old Cabin quartz vein showing are 726.82 g/t (21.19 oz/ton) Au and 959.71 g/t (27.98 oz/ton) Au. On August 27, 1996, the vein had been traced over 290 m with widths exceeding 1 m. Gold values are present over 200 m of this distance. Fourteen selected mineralized samples from the South Cole Lake quartz-sulphide zone averaged 36.67 g/t (1.07 oz/ton) Au, 174.59 g/t (5.09 oz/ton) Ag, 3.13 percent Pb, and 2.63 percent Zn. The company has already carried out a drill program of shallow holes which gave best assays of 4.05 g/t (0.12 oz/ton) Au to 10.19 g/t (0.3 oz/ton) Au over narrow widths. Although these results are below expectation, the joint venture will continue to explore in this area.

Flin Flon Domain

Amisk Joint Venture

In addition to spending $2.5 million to earn a 35 percent working interest in the joint venture, Claude Resources Inc. can earn another 35 percent by spending a further $14.0 million or by bringing the Amisk Lake property into commercial production. The option agreement covers 18 800 ha in the northern portion of the lake where Claude Resources Inc. has a 100 percent interest in a further 1700 ha. The company believes that the area as a whole, which hosts numerous mesothermal and epithermal gold vein showings, is one of the major unexplored gold camps in Canada. Claude Resources Inc. has concentrated to date on the Laurel Lake deposit which lies in the Laurel Lake 'rhyolite dome complex'. Mineralization comprises distinctly veined pyrite/tetrahedrite, pyrite/chalcopyrite, and galena/sphalerite zones. Following completion of Phase I and II of the cur-

rent four phase drill program, a resource of 1 423 000 t at 13.38 g/t (0.39 oz/ton) Au over a minimum mining width of 1.5 m has been outlined, within which a reserve of 920 788 t of 14.75 g/t (0.43 oz/ton) Au (uncut) is in the probable and possible category. This compares with previously quoted resources of 540 000 t at 11.34 g/t (0.36 oz/ton) Au. The Laurel Lake zones are open along strike and at depth. Phase III drilling commenced October 2, 1996 and is designed to test the main mineralized zones at depth. Phase IV, which will immediately follow Phase III, will focus on extending reserves along strike. The company has plans to dewater the Laurel decline and take a bulk sample. Surface trenching has also been carried out by Claude at the Prince Albert Mine 2 km to the north.

BASE METALS

There has been no base metal production in Saskatchewan since mining of the Saskatchewan portion of the Flin Flon Main Mine, South Main deposit ceased in 1992; however, mining of the North Zone of the Callinan Deposit is expected to extend into Saskatchewan this year. In 1996, base metal exploration programs were undertaken in the southeastern shield area for volcanogenic massive sulphide (VMS) mineralization, in the Western Craton for magmatic nickel-copper mineralization, and in the Wollaston Domain for sediment-hosted copper and lead-zinc.

Flin Flon Domain

Konuto Lake Proposed Mine

Hudson Bay Mining and Smelting Co., Limited (100%)

The Konuto Lake deposit, which was discovered on claim S-99618 in 1994, is hosted by mafic island arc volcanics of the Ruth Lake Assemblage. This typical VMS-type deposit has a northerly trending, maximum strike length of 250 m and dips steeply to the east. Mineralization, comprising chalcopyrite, pyrrhotite, pyrite, lesser sphalerite, locally common arsenopyrite, and magnetite is contained within two concordant, stacked, sulphide lenses (No. 1 and No. 2 zones). Hydrothermal alteration, dominated by green-black chlorite, occurs between the No. 1 and No. 2 zones and locally includes a near ore grade chalcopyrite-pyrrhotite stringer zone (No. 3 zone) consisting of variably chloritized, carbonatized, and silicified rocks with disseminated sulphides. The alteration occurs only adjacent to the sulphide lenses. Mineralization extends from near surface to at least 550 m below surface. To date, geological resources (undiluted) are estimated at 1.44 million t (Table 4) grading over 6 percent Cu and 2.5 g/t Au. The bulk of the resources are contained within the No. 1 Lens. Project permit approval and provincial permission to commence mining operations was received in 1996 shortly before Hudson Bay Mining and Smelting Co., Limited announced that mine development of the deposit will be postponed.

Exploration by Hudson Bay Exploration and Development (HBED) in the Konuto Lake deposit area in 1996, included the drill-testing of a series of conductors on the Konuto grid and on an adjacent property optioned from Dale Hoffman.

Callinan Mine

Hudson Bay Mining and Smelting Co., Limited (100% subject to 6.67% NPI with Consolidated Callinan Flin Flon Mines Ltd.)

Mining of the Callinan zinc-copper deposit continued in 1995-96 with production from the South, East, and North zones. Although all production to date has come from the Manitoba portion of the deposit, production from the Saskatchewan side of the North Zone is scheduled for later this year. From April 1, 1990 to June 30, 1996 the mine produced 3 000 461 t of ore grading 1.45 percent Cu, 3.64 percent Zn, 23.7 g/t Ag, and 2.06 g/t Au. The focus of production has been from the East Zone in which one year of identified reserves remain. Mining of the South Zone, excluding pillars, has been completed. The North Zone, the upper part of which lies predominantly in Saskatchewan, has been developed to the 600 m level. A total geological resource of 535 000 t grading 1.7 percent Cu, 4.1 percent Zn, 22.64 g/t (0.66 oz/ton) Ag, and 2.0 g/t (0.058 oz/ton) Au is located within Saskatchewan. As of January 1996, proven mineable reserves at the Callinan Mine were 2 188 716 t grading 1.42 percent Cu, 3.15 percent Zn, 2.089 g/t (0.059 oz/ton) Au, and 24.6 g/t (0.72 oz/ton) Ag. Probable reserves were 636 643 t grading 1.14 percent Cu, 3.79 percent Zn, 2.06 g/t (0.060 oz/ton) Au, and 30.95 g/t (0.904 oz/ton) Ag.

A high-level of exploration activity continues around the Callinan deposit. HBED has concentrated its work around the East Zone where encouraging drill results continue to be obtained from the three new lenses located in the hanging wall of the East Zone. Consolidated Callinan Flin Flon Mines Limited is drilling on the War Baby claim which covers the down plunge extension of the Callinan orebody in Manitoba. An initial controlled drill hole intersected 6.5 cm of massive pyrrhotite with lesser pyrite, chalcopyrite, and sphalerite at 1761.5 m and 30.4 m of disseminated to near massive pyrrhotite with chalcopyrite and lesser sphalerite (in the lower Quartz Porphyry or Mine Horizon) from 1873.1 to 1903.5 m which assayed 0.58 percent Cu over 23.9 m. The first wedge, completed to look down plunge and deeper than this intersection, intersected two mineralized zones in the hanging wall and middle portion of the Mine Horizon. The first zone (1898 to 1907.9 m) averaged 3.36 percent Cu over 9.9 m and included 5.0 m of 6.133 percent Cu, 0.237 percent Zn, 0.0199 oz/t Au, and 0.773 oz/t Ag. The lower zone returned 0.42 percent Cu across 11.4 m with the footwall section returning 1.116 percent Cu and 0.376 percent Zn over 2.3 m. The third hole completed, intersected copper mineralization between 1896.15 m and 1902.0 m. A 5.85 m interval returned 3.0% Cu. The copper mineralization seems to steadily improve to the south and down plunge.

Grassroots exploration in the Flin Flon Domain included the completion of ground geophysical surveys on the Embury Lake Project by Aur Resources. HBED continued to use ground geophysics and follow-up drilling to test targets identified by a 1994 airborne SPECTREM

Table 4 - Published reserves from Saskatchewan base metal properties.

Owner(s)* Venture Operator	Property	Reserves (t) or Production (t)	Grade % Cu	Zn	Pb	Ni	Co	g/t Au	Ag
	MINEABLE								
Cameco–Billiton	McIlvenna Bay								
	Cu Zone	5 872 000	2.25	2.32	-	-	-	0.73	28.5
	Zn Zone	7 208 000	0.46	7.10	-	-	-	0.36	25.0
Hudson Bay Mining	Callinan								
	proven	2 188 716	1.42	3.15	-	-	-	2.09	24.6
	probable	636 643	1.14	3.79	-	-	-	2.06	30.95
	Sask portion	535 000	1.70	4.10	-	-	-	2.00	22.64
	GEOLOGICAL								
Con. Pine Channel	Rea Lake	±39 916 800	0.1	-	-	0.1	-	-	-
CopperQuest Inc.	Knife (Mokoman) Lake	12 000 000	1.07	-	-	-	-	-	-
Claude Resources	Elizabeth Lake	6 077 570	0.68	-	-	-	-	-	-
Boart–Longyear	Brabant/PEG Deposit	4 860 000	0.57	5.19	0.28	-	-	0.2	22.6
Hudson Bay Expl.	FON Zone	4 650 307	-	4.6	-	-	-	-	-
Comaplex Resources	Dianne Lake	4 536 000	0.4	-	-	-	-	-	13.7
Con. Pine Channel	Axis Lake	3 402 000	0.6	-	-	0.60	0.15	-	-
Compulsion River	George Lake	2 630 880	0.53	3.67	-	-	-	-	-
Internat. Mahogany	Dunlop Deposit	2 062 950	0.35	-	-	0.61	-	-	-
Aur Resources	Schotts Lake	1 983 850	0.61	1.35	-	-	-	-	-
Ducommun, Margaret	Gochager Lake	1 542 240	0.74	-	-	0.74	-	-	-
Aur–Cameco	Bigstone Lake	1 451 000	2.9	-	-	-	-	-	-
		308 000	-	11.2	-	-	-	-	-
Hudson Bay Mining	Konuto Lake	1 440 000	>6	-	-	-	-	2.5	-
Undisposed Land	Dinty Lake	1 360 800	-	-	-	0.6	-	-	-
Undisposed Land	Brownell Lake	1 251 900	0.56	1.75	-	-	-	-	-
Lederhouse, Mike	Borys Lake	1 212 473	-	1.91	1.91	-	-	-	-
Comaplex Resources	HBED Zone	589 680	0.5	3.0	-	-	-	-	-
Hudson Bay Mining	Callinan North**** (Sask)	535 000	1.7	4.1	-	-	-	2.0	22.6
Consol. Callinan	Quandt/Ramsay/Keputch	335 000	2.5	2.0	-	-	-	-	-
Undisposed Land	Otonadah Lake	100 000	3.4	1.5	-	-	-	-	-
Claude Resources	Pitching Lake	90 720	2.6	-	-	-	-	-	-
Shupe, Walter	Howard Lake	54 400	0.44	-	-	1.03	0.04	-	-
Cons. Pine Channel	Currie Lake	47 536	-	-	-	0.79	-	-	-
Noranda Mining	Sito Lake East	45 360	-	4.5	-	-	-	-	-
Hudson Bay Expl.	Echo/Alf	36 288	4.00	-	-	-	-	-	-

Notes:
* Operator first.
** <30 m drill spacing.
*** 30 to 60 m drill spacing.
**** Geological resources.

survey. Several drill holes were completed at Amisk Lake on a property optioned from Freewest Resources Canada Inc. and Formation Capital Corporation. Geological mapping was completed in the Creighton-Hillary lakes area and a TDEM survey and drilling on targets in the Tyrrell Lake area. Consolidated Pine Channel Gold Corporation and JNR Resources Inc. have optioned the Denare Beach Property from Wayne Fisher. A fall geophysical program and possible follow-up drilling is planned for this property which ties in closely with that surrounding the Konuto Lake Deposit.

Sub-Phanerzoic Area

Aur Resources Ltd., for a Thunderwood Resources Inc.–Cameco joint venture, completed a drill program to examine possible extensions of the Bigstone Lake Cu-Zn deposit. Ore grade Cu-Zn mineralization, which subcrops beneath the Phanerozoic (Ordovician) cover, was intersected down-plunge from the Main Zone. Drill hole BS-211 intersected 2 percent Cu and 0.2 percent Zn over 55.5 m and a later hole intersected 1.6 percent Cu and 0.2 percent Zn over 5.5 m. In addition, a hole which tested the nearby East Zone intersected 0.46 percent Cu, 0.12 percent Zn, and 0.10 g/t Au over 53.0 m.

At the nearby Balsam property, a partnership involving Aur Resources Ltd., Troymin Resources Ltd., Thunderwood Resources Inc., and Consolidated Abitibi Resources Ltd. completed a magnetic survey and seven drill holes. Six of these holes were drilled on the over 1500 m long Balsam zone of VMS style Cu-Zn-Au mineralization. Drill hole 96-57 intersected a new deeper zone of Zn-Cu-Au mineralization within altered felsic metavolcanics which returned 5.3 percent Zn, 0.4 percent Cu, and 0.2 g/t Au over 7.4 m. A second phase of drilling is planned to further evaluate this new zone. In the area south of Suggi Lake, Cominco Ltd. completed a ground UTEM survey and two anomaly holes on the Berland West property and four anomaly holes on the adjacent Tyacke property. The Cameco Corporation (operator)–Billiton Metals Canada Inc. joint venture partnership was again inactive at the McIlvenna Bay Cu-Zn deposit.

Kisseynew Domain

Leader Mining International Inc. has optioned the Knife (Mokoman) Lake copper project from CopperQuest Inc. Pyrite, pyrrhotite, and chalcopyrite mineralization occurs within a 366 m long and 23 m to 46 m wide zone. The host rock is described as a multiple folded pegmatitic felsic gneiss. Current reserves are listed as 6 million tonnes averaging 1 percent Cu plus significant Au, Ag, Ni, and Zn. A Phase I, 35 hole program of delineation drilling, resulted in the discovery of a new zone of mineralization with a strike length of at least 200 m. The discovery hole returned 2.67 percent Cu plus Au and Ag values over 11.6 m. The open pit mineable reserves have been increased to 12 million tons grading 1.07% Cu with significant gold and silver values or 10 million tons at 1% Cu plus gold and silver values. Phase II drilling, comprising 50 holes, is to begin immediately, and a production feasibility study to evaluate the possibility of open pit mining is currently under way. A Phase III program of 35 to 40 holes is expected to follow.

La Ronge Domain

In the La Ronge Domain, Gitennes Exploration Inc. tested six new geophysical targets and completed one deep drill hole on the Howard Lake Ni-Cu property (ML 5180). The drilling intersected massive iron sulphides which returned low base metal values. The deposit, which contains drill indicated reserves of 54 400 t of 1.03 percent Ni, 0.44 percent Cu and 0.04 percent Co, is hosted by the pyroxenite phase of a small ultramafic-mafic body intruded into migmatites of the Nut Bay Belt. The property was returned to W. Shupe.

Wollaston Domain

Two base metal exploration programs were undertaken to evaluate known occurrences of SEDEX-style Pb-Zn and red bed-type copper mineralization respectively. Farwest Mining Ltd. and a wholly-owned subsidiary, conducted till and soil geochemical sampling, geophysical surveys, and completed seventeen drill holes on the Compulsion River Property in the George-Spence lakes area. Eight of the holes returned anomalous Zn values, with intersections of up to 70 m of 0.2 percent Zn. The highest grade intersection was 2.2 percent Pb, 0.2 percent Zn, and 0.1 percent Cu over 0.5 m.

Noranda Exploration & Development Corporation completed a program of line cutting, ground magnetic surveys, prospecting, and geological mapping on the Pendleton Lake property at Janice Lake to evaluate new showings which were discovered by a 1994-95 Saskatchewan Energy and Mines field mapping program.

Western Craton

A Uranerz Exploration and Mining Limited–Kensington Resources Ltd. partnership continued to explore the area around the Clearwater Anorthosite Complex for Voisey's Bay style Ni-Cu-Co mineralization. A GEOTEM EM and magnetic survey was flown and follow-up ground geophysics, geological mapping, and prospecting were completed over four areas with airborne anomalies. Ni-Cu mineralization within ultrabasic intrusive rocks was noted at the Camel Lake and Careen Lake showings. In September 1996, a ten-hole drill program was completed to test probable metallic conductors in the area. Analytical results from sampled nickel- and copper-bearing iron sulphide mineralization are awaited.

Shore Gold Inc. completed a program of detailed prospecting on the Virgin River property which straddles the Virgin River Shear Zone separating the Virgin River and Western Granulite domains. Prospecting concentrated on the limbs and nose of a large fold structure, which straddles the Virgin River Shear Zone, where airborne EM anomalies coincided with areas shown to be anomalous in Ni-Cu, by past bedrock geochemical sampling surveys conducted by the Government of Saskatchewan in the late sixties. Several new nickel showings

and gold-in-quartz showings were discovered. The next stage of exploration, which will be completed later this year, will include an airborne EM and magnetic survey, ground geophysics, and drilling.

Consolidated Pine Channel Gold Corporation and JNR Resources Inc. completed reconnaissance prospecting on CBS 8175, which covers the east half of Norite Bay, to ground check anomalies selected from a recently acquired airborne survey. The claim covers two old norite-hosted nickeliferous pyrrhotite occurrences. Consolidated Pine Channel has reported the discovery of new Ni-Cu showings on the property.

DIAMONDS

The amount of land under disposition for diamond exploration has continued to decline, totalling 0.67 million ha on October 1, 1996. This compares with some 4 million hectares under disposition at the height of the diamond boom in 1994. However, diamond exploration expenditures are expected to rise 50 percent this year from $4 million to $6 million. Most of the diamond properties are in an area running across the province between latitudes 53° and 55° which includes Fort-à-la-Corne (FALC), the Pasquia Hills, Molanosa Arch, and Candle, Sturgeon, Smoothstone, and Wapawekka lakes. Although the two largest 1996 drill projects tested the FALC kimberlite cluster and its north extension into the Candle Lake area, more than one dozen other companies have drilled or expect to drill in a total of nine joint venture programs.

Kennecott Canada Inc. can acquire a 60 percent interest in the Candle Lake project from War Eagle Mining Company and Great Western Gold Corporation by spending $8 million over five years for exploration and development. In 1994, the Candle Lake joint venture reported the discovery of five diamond-bearing pipes of which three formed a cluster. Diamonds recovered from the pipes in 1994 were 95 percent clear, white stones and the indicator minerals were similar to those from known diamond producers. Kennecott's 1995 drill program completed nine holes on kimberlite #29/30, which drilling and geophysical surveys indicated was one large kimberlite with a minimum length of 1300 m and width of 460 m. Kimberlite #29/30 is approximately 18 m thick in holes drilled closest to the edge and increases to more than 100 m thick towards the center. It has an inferred mass of >63.5 million t.

A 1345 kg sample of drill core from the nine holes was treated with caustic fusion to recover 181 diamonds of which 32 were macrodiamonds (>0.5 mm) and 149 were microdiamonds. No diamonds greater than 1.2 mm in size were recovered and 152 or 84 percent were clear and white. DDH 95-1, located in the northwest sector of kimberlite #29/30, was the best hole that year, in which 60 diamonds, including 10 macrodiamonds, were recovered from 132 kg of sample.

Kennecott Canada Inc. completed an airborne TEM survey in the first part of 1996. Ground magnetic and resistivity surveys plus a gravity profile were carried out on the Torch River property and an 11 hole definition drill program tested kimberlite #28. The surface expression of this "banana" shaped glacially eroded kimberlite is a valley, trending northerly at its north end and northeasterly to the south. The shallowest depth from surface to kimberlite is 102 m. The unbedded kimberlite has a maximum thickness of around 140 m, is shaped like a very flat 'v' in long section and a cone in cross-section. The top is dome shaped; the sides dip outward at 45°. It is postulated that the kimberlite represents a "spatter cone" in which variations in the level of activity have given visible variations in grain size defined by gradational changes over a few metres rather than distinct bedding. The company plans to take a 35 t to 40 t bulk sample this year from kimberlite #29/30 and possibly also a sample from kimberlite #28.

The FALC diamond project is a joint venture between Kensington Resources Ltd., Uranerz Exploration and Mining Limited (operator), Cameco Corporation, and Monopros Limited, a wholly owned subsidiary of De Beers. Kensington recently acquired a 25 percent participating interest in the FALC joint venture for $3.4 million paid directly into exploration programs, so that each company now has a 25 percent interest. Exploration is focussed on 71 magnetically-defined kimberlite bodies, which together form one of the largest kimberlite clusters in the world. The individual bodies typically are twice the size of kimberlites elsewhere, and are relatively unique, almost completely preserved pyroclastic kimberlite volcanoes. This accounts for their comparatively larger mass.

Although Uranerz continues to be operator, Kensington coordinates and manages the fieldwork. Diamond grades for the joint venture's 1995 eight, large diameter, reverse circulation holes drilled in separate kimberlite bodies are presented in Table 5, together with that for hole 145-04 drilled in 1994, but not fully processed until 1995. Table 6 gives inferred tonnage and diamond grades for the best three kimberlite bodies tested to the end of 1995.

The 1996 drilling program consisted of 28 small diameter and two medium diameter holes. Twenty-two of these holes drilled untested kimberlite targets; another six further evaluated kimberlite bodies where encouraging results had been obtained from previous holes. One further hole was abandoned in overburden. On completion of the 1996 program, all except four of the 71 interpreted kimberlite bodies on the property had been tested with drill holes. Macrodiamonds have been recovered from 27 of the 54 diamondiferous bodies tested since 1989.

A total of 153 caustic dissolution samples representing all the kimberlite intersected in the drilling program were submitted to Lakefield Research and the Saskatchewan Research Council (SRC) laboratories for diamond recovery analysis. Microdiamonds and macrodiamonds were recovered from 20 of this year's drill holes. Significant results are presented in Table 7. The joint venture considers the caustic dissolution sample results to be positive and to justify follow-up processing of minibulk samples of the most interesting holes to recover macrodiamonds. This work will be undertaken at the SRC laboratory in Saskatoon. Studies to define poten-

Table 5 - Summary of diamond grades for the 1995 drilling program completed on the Fort-à-la-Corne diamond property.

	Microdiamond Samples (20 kg)						Minibulk Samples	
Drill hole	Sampled Thickness (m)	Mass (kg)	No. of Samples	No. of Micro-diamonds	Stones per 10 kg	Grade >1.0 mm (carats/t)	Mass (t)	Grade >1.0 mm carats/t
116-02	156.5	52.0	3	0	0	0.0	26.494	0.0
119-03	177.5	52.0	3	0	0	0.0	31.908	0.0
122-08	74.2	32.0	2	3	1	0.4600	13.013	0.0102
126-01	208.0	73.0	4	0	0	0.0	36.985	0.0034
133-01	239.5	92.0	5	33	4	0.0	40.992	0.0011
140-08	234.0	91.0	5	40	4	0.1686	41.634	0.0246
145-04	164.0	171.0	9	136	8	1.2050	28.682	0.0282
147-03	114.5	34.0	2	58	17	0.0	20.038	0.0751
163-01	153.0	62.0	4	0	0	0.0	26.575	0.0
Total:	**169.0***	**659.0**	**37**	**270**			**266.321**	

Notes:
* Arithmetic average.

Table 6 - Fort-à-la-Corne 1989 to 1995 summary of diamond grade for the best three kimberlite bodies.

		Microdiamond Samples (20 kg)				Minibulk Samples		
Body	Kimberlite Body Estimated Mass (t)	Mass (kg)	Total Samples	Total Macro-diamonds	Grade >1.0 mm carats/t	Grade >1.0 mm carats/t	$US/carat t	Sampled Thickness
122	540 000.000	533.0	23	167	0.14479	0.0441	$44.00	97.0
140	536 848.200	889.6	44	289	0.08004	0.0413	$104.20	24.0
145	213 460.000	700.0	33	424	0.55635	0.0125	$184.00	36.0

Table 7 - Significant diamond recovery results for the caustic dissolution samples from the 1996 Phase I drilling program at the Fort-à-la-Corne property.

Kimberlite Body and Drill hole Number	Sampled Thickness (m)	Number of Samples	Sampled Mass (kg)	Total[1]		Stones >1.0 mm		Total Diamonds[1] per 10 kg Sample	
				Number	Weight[2] (carats)	Number	Weight[2] (carats)	Number	Weight[2] (carats)
123-03	87.9	5	86.3	14	0.2778	1	0.2747	2	0.0322
145-05	158.2	7	120.0	23	0.0213	1	0.0171	2	0.0018
155-01	138.4	6	105.6	12	0.0109	0	0.0000	1	0.0010
176-01	175.0	7	115.3	95	0.1437	1	0.1381	8	0.0125
220-01	74.1	3	50.9	36	0.0164	1	0.0101	7	0.0032
221-01	171.0	8	131.6	30	0.0546	2	0.0266	2	0.0041
223-01	63.9	4	68.0	10	0.0021	0	0.0000	1	0.0003

Notes:
[1] Includes microdiamonds and macrodiamonds.
[2] Diamonds larger than 0.25 mm in one dimension were weighed; the weight of the balance was estimated by measuring the three dimensions of individual diamonds.

tially higher diamond grade zones are ongoing. Caustic dissolution samples from hole 123-03 contained a 0.2747 carat white and clear macrodiamond that may be a fragment of a larger stone. A similar fragment, weighing 0.1381 carats was recovered from hole 176-01 which penetrated an untested kimberlite target. Results from the richest kimberlite body (#145) discovered to date are consistent with earlier data. Three macrodiamonds weighing 0.0367 carats were recovered from holes 220-01 and 221-01 that intersected previously untested kimberlites.

In the north part of the area being explored for diamonds, Whiteswan Resources Inc. used a mini-mag helicopter-borne survey, flown at 60 m above the ground on lines 50 m apart, in an attempt to eliminate the ground checks normally undertaken to detail airborne anomalies. Later the company completed five of 10 holes planned in their Phase I drill program. Holes 1 to 4 were on the Nipawin Park property and hole 5 on the Montreal Lake property. The magnetic anomalies tested proved to be other than from kimberlites. A Consolidated Pine Channel Gold Corp. operated joint venture expects to drill on S-101388, lying at the north end of a possible controlling structure for the Fort-à-la-Corne–Candle Lake kimberlite trend. Petro Plus Inc. also expects to drill-test five anomalies out of a total of 15 prioritized anomalies on their Big Sandy property after freeze up. Farther south, Shore Gold Fund Inc. intersected kimberlite in all five holes drilled on four distinct magnetic anomalies, delineated by airborne and ground magnetic surveys, on claims located in the southern portion of the main FALC kimberlite cluster. The first kimberlite, intersected by holes 1 and 5, is 500 m in diameter, predominantly diatreme-facies and a minimum of 245 m thick in its central portion. Holes 2, 3, and 4, drilled 1.5 km west of the first kimberlite, were spaced approximately 1 km apart, but may have intersected one large kimberlite body measuring 2 km by 1.5 km. The western holes each intersected the same kimberlite units comprising approximately 100 m of predominantly crater-facies kimberlite mixed with crater sediments. All core samples are being prepared and processed at the SRC laboratory in Saskatoon using the caustic fusion method to recover both micro and macro diamonds. As of the end of October, less than 10 percent of the core samples from holes 1 and 3 had been processed. However, diamonds have been recovered, indicating both pipes are diamondiferous.

In other activity, the Golden Kootenay Resources Inc.–Big I Developments Ltd.–Carbon Reef Resources Inc. joint venture contracted a rig to drill one hole on their "Birdseye" property about 8 km east of Ridgedale; Nu-Dawn Resources Ltd. completed two water well-type holes about 25 km west of Melfort, and the Saskatchewan Diamond Syndicate (Swannell Minerals Corp. (operator, 42.5%), Laminco Resources Inc. (42.5%), Calco Resources Inc. (10%), and Guardian Enterprises Ltd. (5%)) drilled one hole on S-128474 north of Smeaton, to test a pipe-like magnetic body with a 200 m diameter, identified by a 1994 fixed-wing magnetic survey. On October 11th, the hole was reported to have intersected kimberlite at a depth of 128 m and to be still in kimberlite at 177 m.

In April, Altmark Energy Inc. and Rhonda Mining Corp. settled their dispute with Surf Oil involving claim ownership in the FALC diamond play area. Altmark also acquired, through option, Rhonda's interest in the claims. By mid-June, Altmark was in a position to resume exploration on its FALC claims, which total 64 752 ha and are mostly owned 100 percent. They surround much of the FALC cluster and cover potentially diamond-enriched, water-reworked, apron deposits of diamondiferous kimberlite thrown out by the FALC eruptions. Preliminary small-diameter drilling has already yielded macrodiamonds from these claims. The initial phase of the new exploration program, budgeted at $0.6 million, is scheduled for the first half of 1997. At Snowden, Altmark Energy Inc., through its wholly owned subsidiary Kimmswick Diamonds Inc., also has a joint venture with Lucky Break Gold Inc. on 22 claims in which Lucky Break may earn a 50 percent interest. Here a deep, strong, arcuate magnetic anomaly over 15 km long may be masking the presence of weaker magnetic anomalies characteristic of near-surface kimberlite craters and apron deposits. Drilling is planned to commence in early 1997.

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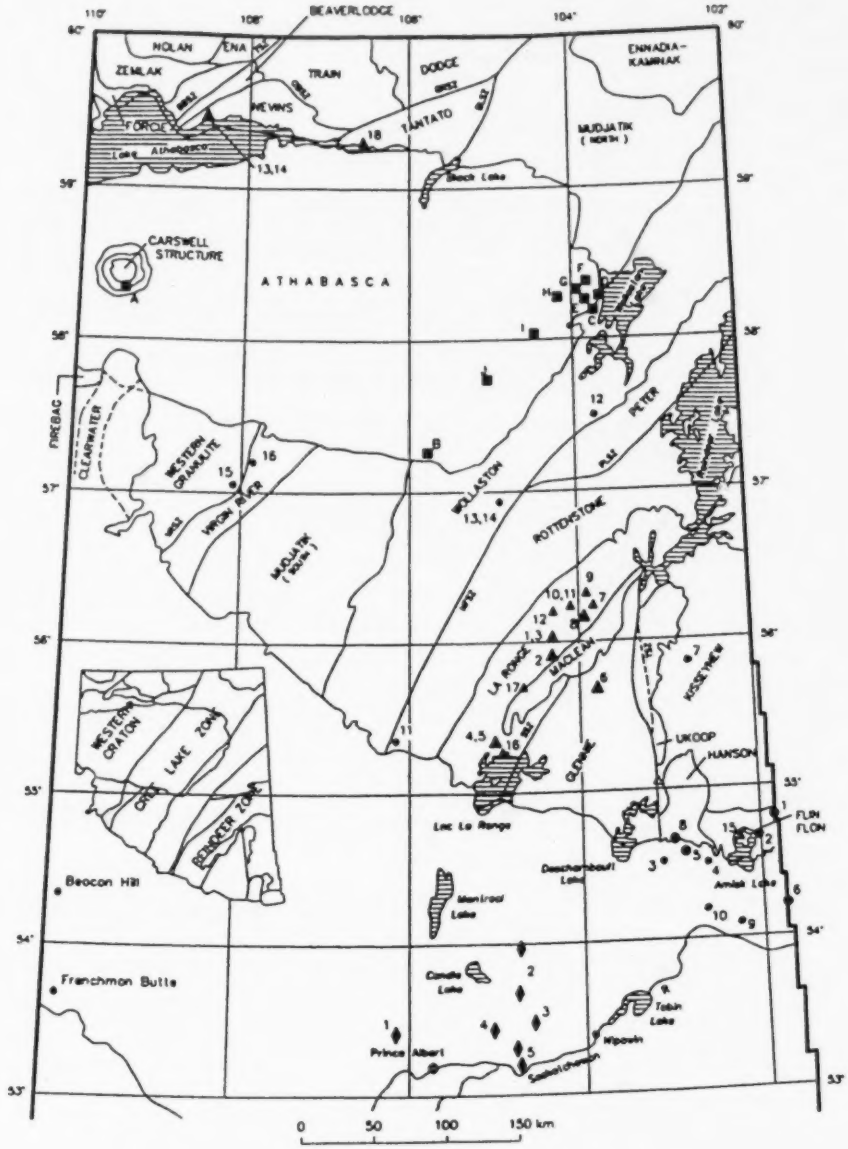

MINERAL DEPOSITS AND EXPLORATION AREAS

Uranium *(squares): (A) Cluff Lake, (B) Key Lake, (C) Rabbit Lake, (D) Collins Bay–Eagle Point, (E) McClean Lake, Sue Trend, (F) Jeb, (G) Dawn Lake, (H) Midwest, (I) Cigar Lake, and (J) McArthur River, P2 North.*
Gold *(triangles): (1) Jolu mine, (2) Jasper mine, (3) Star Lake mine, (4) Contact Lake mine, (5) Pap SW, (6) Seabee mine, (7) Weedy B–Golden Heart, (8) Komis mine, (9) Twin, (10) Corner, (11) Tower East, (12) Niko, (13) Box mine, (14) Athona mine, (15) Amisk Joint Venture–Laurel Lake, (16) Anglo-Rouyn Tailings, (17) Devil Lake, and (18) Norite Bay.*
Base Metals *(circles): (1) Flin Flon and Callinan mines, (2) Konuto Lake, (3) Bigstone Lake, (4) Balsam Lake, (5) McIlvenna Bay, (6) Namew Lake, (7) Mokoman (Knife) Lake, (8) Western Nuclear mine, (9) Berland Property, (10) Tyacke Property, (11) Howard Lake, (12) George and Spence lakes, (13) Rafuse and Juno lakes, (14) Kaz Showing, (15) Clearwater Anorthosite, and (16) Virgin River.*
Kimberlites *(diamonds): (1) Sturgeon Lake, (2) Candle Lake, (3) Snowden, (4) Foxford, and (5) Fort-à-la-Corne.*

SASKATCHEWAN MINERAL PROPERTIES AVAILABLE FOR OPTION

Name	Disposition Number	NTS Block & Domain	Commodity	Tonnage (t)	Grade	Assays	Mineralization Type	Contact
Broken Hammer	CBS 6120	64D-5 La Ronge	Au			grab 720 g/t Au	structurally-hosted quartz vein	Alligator Resources Barry Collins (306) 373-4500
Dickens Lake Greywacke	CBS 8911 CBS 6930 S-101079 S-99911 S-101254 S-101476 S-101817 S-101818	73P-15 MacLean	Au	297 710	9.2 g/t	12.7 g/t Au over 0.5 m 32 g/t Au over 7.5 m	disseminated gold in clastic metasediment	Cameco Corporation Rick Vanderhorst (306) 956-6345
Nirdac Creek Showing	CBS 7661	64M-13 Mudjatik	Au + Cu			drill hole 13.7 g/t Au over 1.5 m	disseminated Au in iron formation	Highrock Contracting Rod Spooner (306) 425-2828
Phantom Lake Property	CBS 3194	63K-12 Flin Flon	Au			chip 93.0 g/t Au over 3.0 m	shear-hosted quartz veining	Ray-Dor Resources Richard Murray (204) 887-4905
Rosie Showings	S-104730	64D-10 La Ronge	Au + Cu			grab 1.7% Cu 25 g/t Au	stringer Cu in metamorphosed alteration zone	Highrock Contracting Rod Spooner (306) 425-2828
Truscott Lake Showing	S-101565 S-101566	63M-13 Glennie	Au + Cu			grab 0.23 g/t Au 0.68% Cu	gold-in-quartz in quartzite	Nanook Exploration Ivan Young (306) 249-3015
Upises-Teneycke Lakes	CBS 5284	73P-7 La Ronge	Au + Cu			grab 170 g/t Au	structurally hosted quartz vein	Highrock Contracting Rod Spooner (306) 425-2828
Wildnest Property	CBS 3245	63M-1 Kisseynew	Au-Zn-Pb	660 000	3.5 g/t Au		silicified shear zone in gneiss	Ray-Dor Resources Richard Murray (204) 887-4905
Wilson Lake	S-105369	73P-16 La Ronge	Au			0.181 oz/ton Au over 1 m	shear-hosted Au	Partndge Contracting David Partndge (306) 425-4498
Wood Lake Claims	S-104732 to 104734 S-104736 S-104737	63M-3 Glennie	Au			drill core 13.0 g/t Au over 3.6 m	shear-hosted Au in quartz veining	Highrock Contracting Rod Spooner (306) 425-2828
Brabant/Peg/ McKenzie	ML 5054	64D-4 MacLean	Zn-Cu-Pb	4 860 000	5.19% Zn 0.57% Cu 0.28% Pb 22.6 g/t Ag 0.22 g/t Au		sediment-hosted stratiform base metal sulphide SEDEX/VMS (?)	Boart Longyear Inc. Bruce Miller (306) 931-4466
Brownell Lake	S-101336	63M-4 Glennie	Zn-Cu	1 252 200	1.75% Zn 0.56% Cu		VMS	Spectra Management Mike Lederhouse (306) 425-2799
Elizabeth Lake	S-103570	73P-6 La Ronge	Cu	6 077 570	0.68% Cu		VMS (?)	Claude Resources Ned Reid (306) 668-7505
HBED Zone Extension	S-104744 S-104745 S-104829	63M-4 Glennie	Zn-Cu	589 680	3.0% Zn 0.5% Cu		VMS	Comaplex Resources Murray Pyke (403) 265-6973
Pitching Lake A Zone	S-103165 to 103169	73P-8 Glennie	Cu	90 720	2.60% Cu	8.03% Cu over 5.2 m	VMS	Claude Resources Ned Reid (306) 668-7505
Axis Lake	S-103569	74P-5 Tantato	Ni-Cu-Co	3 402 000	0.6% Ni 0.6% Cu 0.15% Co		differentiated mafic (norite) intrusion	Consolidated Pine Channel Dale Hoffman (604) 684-5118
Currie Lake	S-103567	74O-8 Tantato	Ni-Cu-Co	47 537	0.79% Ni	1.17% Ni 0.30% Cu over 2.0 m	differentiated mafic (norite) intrusion	Condolidated Pine Channel Dale Hoffman (604) 684-5118
Gocharger Lake Ivy	S-97963 S-97970 S-100209 S-100221 S-100226 S-100227	73P-15 La Ronge/ Crew	Ni-Co-Cu	1 542 240	0.74% Ni-Cu combined		disseminated massive sulphide in ultramafic intrusion	Margaret Ducommun (306) 425-3081
Howard Lake	ML 5180	73P-5 La Ronge	Ni-Cu-Co	60 000	1.03% Ni 0.44% Cu 0.04% Co		differentiated mafic intrusion	Walter Shupe (306) 425-2182
Rea Lake	S-103569	74P-5 Tantato	Ni-Cu-Co	63 867 000	0.1% Ni 0.1% Cu		differentiated mafic (norite) intrusion	Consolodated Pine Channel Dale Hoffman (604) 684-5118